CHAPTER 5 - ALTERNATIVES

INTRODUCTION

This section uses conclusions and findings of previous sections of the Master Planning process for GON to identify and evaluate various alternatives for both the airside and landside components of the airport. The underlying objective is to meet the identified needs for both capacity and safety requirements for the entire airfield operation and infrastructure. The key elements of this process are the identification of alternative ways to address previously identified facility requirements; an evaluation of the alternatives such that stakeholders gain a thorough understanding of the strengths, weaknesses, and other implication of each; and selection of the preferred alternative.

DEMAND/CAPACITY & FACILITY REQUIREMENT REVIEW

Chapter Three compared the capacity of all airport infrastructure and facilities to accommodate existing and forecasted demand. Facility requirements were calculated for existing conditions (2010) and the forecast years of 2015, 2020, and 2030 (end of the short, intermediate, and long-terms respectively). Notable changes in the 20-year planning period include:

- 45% increase in based aircraft, including a 77% increase in turbojet aircraft
- 18% increase in operations
- 46% increase in passenger enplanements (primarily due to charter/on-demand activity)
- No change in the critical design aircraft or airport reference code (C-II)

To ensure a strong operating base, primary attention must be given to accommodating and enhancing the facility to meet the upper end of the general aviation fleet; that is, larger corporate class turbofan and turboprop aircraft. By doing so, the airport will support both forecasted demand while positioning the facility to handle limited air carrier operations, should the need arise.

FACILITY REQUIREMENTS

Only those facilities identified as requiring capacity and/or safety improvements are evaluated in this section. The evaluation includes development of alternatives as well as an operational performance assessment, and best planning tenets based on FAA airport planning and design guidelines[1]. In addition, environmental factors that may influence these proposed changes, and a financial assessment are included. The proposed

[1] FAA AC 150/5060-6B, *Airport Master Plans*

requirements were addressed earlier in this report (see *Summary of Airport Facility Requirements*, page 105) and are summarized below.

Airside

a. Reduce Runway Width
b. Upgrade airfield lighting
c. Upgrade instrument approach procedures

Landside

a. Upgrade general aviation facilities
b. Replace ARFF equipment
c. Increase SRE capacity
d. Expand SRE Building

ALTERNATIVES ANALYSIS

Included in this section is the identification of opportunities for development as well as possible development constraints within the airport area.

REDUCE RUNWAY WIDTH

Runway 05-23 is 150 feet wide and Runway 15-33 is 100 feet wide. Under current design standards, Runway 05-23 should be at least 100 feet wide and Runway 15-33 needs to be at least 75 feet wide.

Maintaining existing pavement provides a safer operating environment especially for crosswind landings. Removing pavement decreases impenetrable surfaces, which enhances environmental credits. Also reduced pavement width does provide a slight decrease in operations and maintenance costs. However, removing usable pavement is not recommended at this time, but should be reevaluated when the next major runway reconstruction project planning phase.

UPGRADE AIRFIELD LIGHTING

Airfield lighting will require upgrading; particularly the REILS and PAPI/VASI because the airport has older systems nearing the end of their usefulness and newer systems are available. In addition, changes in an airport's operating conditions may warrant installation of systems not previously required, such as the addition of VGSI where none previously existed.

For increased energy and maintenance efficiency, runway and taxiway lights should be converted to light emitting diode (LED) fixtures (when technically available), but not before they are due for replacement, which is usually during major pavement reconstruction. While LED taxiway lights are currently available and FAA approved, the

existing fixtures are adequate and should not be replaced before they've reached their service life.

UPGRADE LANDSIDE FACILITIES

The most notable change proposed at GON is the possible upgrade to existing landside facilities, primarily the reallocation of land to build revenue producing buildings, including hangars and general aviation related structures. In assessing the correct approach, the sponsor proposed an assessment of one of three options: do nothing, minimal development, and maximum development potential. However, before any decision can be made, the land available for possible construction must be assessed for development potential and viable alternatives studied. It is important to note that the alternatives that follow are not license for wholesale speculative development, but rather options that the sponsor can consider if and when demand is actually realized. In addition, each of the options addressed in subsequent sections will be reviewed for environmental and other planning tenets.

Figure 5.1 shows the entire airport; airside and landside. Figure 5.2 (next page) shows the landside only and highlights areas that are either vacant or underutilized areas, such as automobile parking. For example, the area around the existing terminal/administration building (central terminal area) is largely underutilized, with large areas dedicated to automobile parking (beyond the current and forecasted demand), and open unused areas on the landside and excess pavement on the airside. In both cases, underdeveloped land on an airport reduces potential revenue and makes the facility less viable. In addition, there are costs associated with mowing and pavement maintenance, even when not used. Other undeveloped areas exist in the terminal landside area (both sides of Tower Avenue).

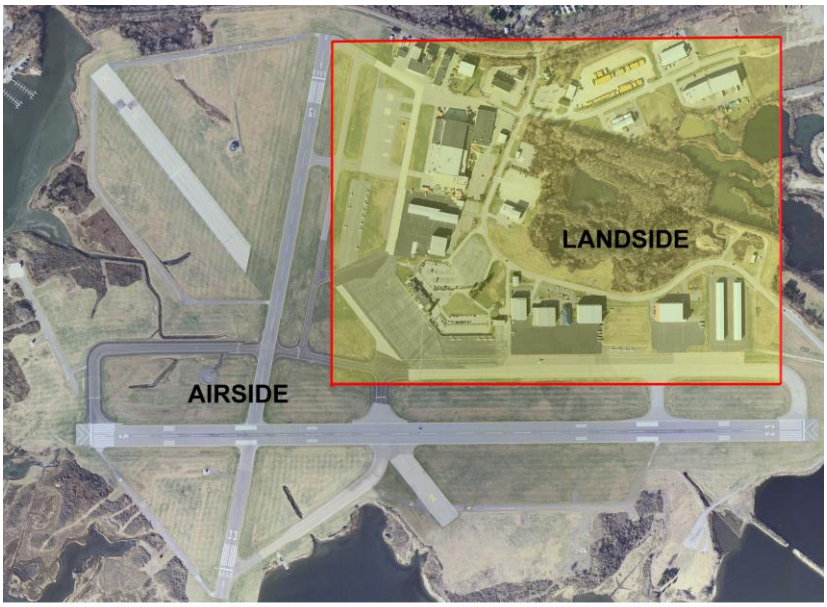


Figure 5.1 - Airside / Landside

Figure 5.2 - Developable Land - Central Terminal Area

The areas shown on Figure 5.2 include:

Area	Description
A	Existing SRE building lot has available space for development of a larger SRE facility.
B	60,000[2] s.f. lot currently used as overflow parking for TASMG and is leased by the military.
C	145,000 s.f. irregular shaped parcel that is currently vacant.
D	100,000 s.f. lot currently underutilized by CAP (and earns no revenue from CAP).
E	110,000 s.f. undeveloped lot. Approximately 10,000 s.f. of Area E rests outside the existing BRL, but is available for parking apron.
F	90,000 s.f. undeveloped lot. 5,000 s.f. of Area F sits outside the BRL, but is available as additional aircraft parking apron or hangar(s).
G	300,000 s.f. of partially developed space used for public automobile parking. Approximately 50,000 s.f. of Area G is currently undeveloped.
H	Area H is 150,000 s.f. of low use aircraft parking apron. This area is seldom used and rests inside the BRL making it prime land for development of revenue producing facilities. A portion of this area is leased by the local flight school for aircraft tiedowns.
I	Vacant, undesignated area.

[2] Area size approximate square footage

ALTERNATIVE 1: DO-NOTHING/NO-BUILD OPTION

The "do-nothing" approach assumes market demand will not require any, or very little development beyond the areas already developed, or under lease agreement pending future construction as demand dictates. This approach will result in little to no cost to the sponsor and in return, little increase in revenue.

ALTERNATIVE 2: MINIMAL DEVELOPMENT

This approach assumes demand for additional hangar and other related aviation business development will exceed areas currently in use or under lease, but not to the point where a full airport growth is required. It allows for bare minimum development of the existing central terminal area identified in Figure 5.2 (page 111). Figure 5.3 (next page) is one possible scenario. This plan converts approximately one-third of the central landside area into viable revenue producing space in the form of hangars and additional aircraft parking apron. It also reconfigures and reduces existing automobile parking and sets aside land on the opposite side of Tower Avenue for compatible aviation activity. It is important to note again that the option shown in Figure 5.3 (page 113) is only a planning concept as one possible alternative. The location, size, and orientation of the three new buildings, automobile parking, entrance roads, etc., shown can, and most likely will be developed to some other concept based on actual demand, developer wishes, and lease negotiations at some future time.

The Minimum Development concept shown in Alternative 2 includes the following:

- Existing Terminal/Administration Building and Control Tower remain unchanged. Other than remodeling and infrastructure upgrades, the two buildings will remain the same basic size in the same location. This includes space for business such as flight training operations, rental car agencies, and a restaurant.
- Hangar numbers 147, 151, 175, and 185 remain unchanged.
- ARFF building (# 165) remains unchanged; however, there is room to enlarge and modernize this facility, or replacement.
- The automobile parking area for both visitors and employees is reconfigured into one or two smaller lots.

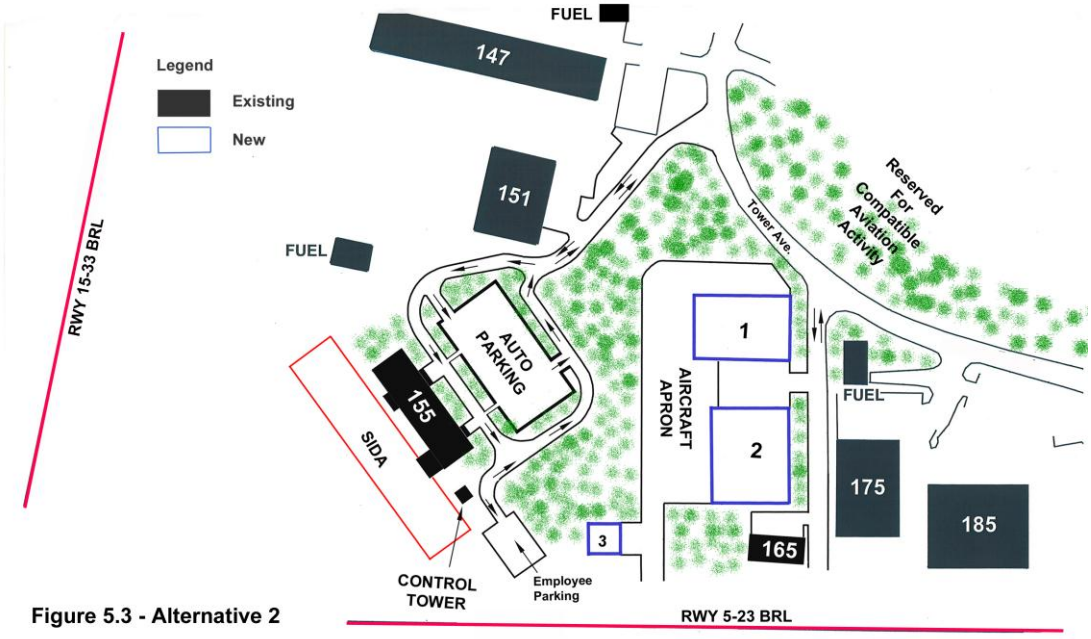


Figure 5.3 - Alternative 2

- The entrance road to the terminal and control tower is redesigned providing one ingress and egress route, with a circular pattern around the main parking lot.
- Three (or more) hangars, depending on size, can be developed in the area (listed as 1, 2, and 3). Hangars 1 and 2 are large corporate structures in the 10,000± s.f. range, while Hangar 3 is a small 2000 - 3000 s.f. building. The footprint, orientation, and general location are easily modified within the available area.
- Ample aircraft apron is possible with a single access taxilane to the main apron.
- The existing access road that currently serves the ARFF Building (165) remains essentially unchanged except for ingress and egress to the hangars.
- Room for compatible aviation related development on the west side of Tower Avenue (3-4 possible parcels identified as Areas B, C, and D on Figure 5.2 on page 111).

ALTERNATIVE 3: FULL BUILD OUT

This approach assumes demand for additional hangar and other related aviation business development will exceed areas currently in use or under lease, to the point where a full-airport build-out is required. It allows for maximum development of the existing central terminal area identified in Figure 5.2 (page 111). Figure 5.4 (page 115) presents a second scenario; one that converts the entire central landside and airside areas into revenue

producing space in the form of hangars and additional aircraft parking apron. One important concept is revenue producing growth of the landside into existing airside assets. This is acceptable provided building heights do not exceed the current BRL height limit.[3]

This concept includes replacing the existing terminal/administration building, control tower, and ARFF facility. Like Alternative 2, it also reconfigures and reduces existing automobile parking and sets aside land on the opposite side of Tower Avenue for compatible aviation activity. It is important to note again that the option shown in Figure 5.4 is only a planning concept as one possible alternative. The location, size, and orientation of the three new buildings, automobile parking, entrance roads, etc., shown can, and most likely will be developed to some other concept based on actual demand, developer wishes, and lease negotiations at some future time. The concept is Figure 5.4 includes the following:

- Existing Terminal/Administration Building, Control Tower, and ARFF building are replaced by a large building that combines all three facilities along with space for additional aviation related business development (FBO, restaurant, etc.), and a medium size hangar).
  - 5A – ARFF Facility
  - 5B – Terminal/Administration
  - 5C – Aviation Business
  - 5D – Hangar or additional Aviation Business
- Two large (10,000± s.f.) hangars (1 and 2)
- Two medium (5,000± s.f.) hangars (3 and 4)
- Three small (2,000± s.f.) hangars (8, 9 and 10)
- Two medium size T-hangars (8-12 aircraft units) (6 and 7)
- Ample automobile parking for passengers, visitors, and employees).
- Single two-way terminal area entrance road off Tower Avenue
- Room for ample compatible aviation development on the opposite side of Tower Avenue.

[3] The BRL shown on Figure 5.2 (page 111) and Figure 5.4 (page 115) represents a 20-foot height limit; that is, at the BRL line, no object should exceed 20 feet in height above the surface. This height decreases at the rate of 1 foot for every 7 feet horizontally the closer the object is to the runway; and increases at the same rate as the object moves further away from the runway.

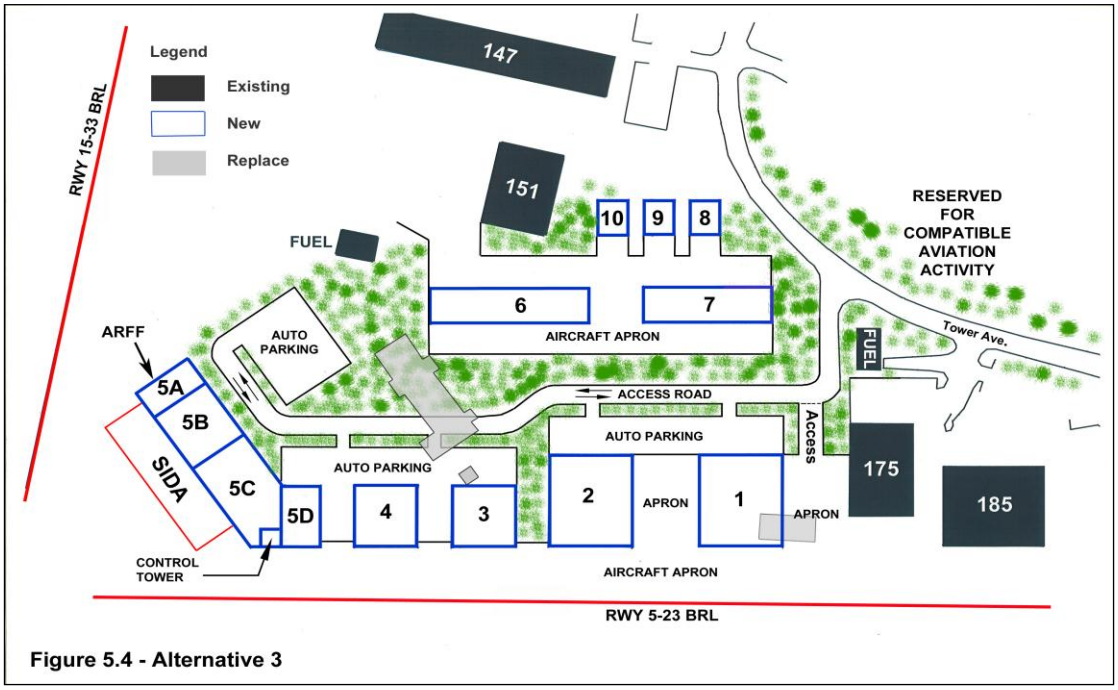


Figure 5.4 - Alternative 3

REPLACE ARFF EQUIPMENT

The airport has two principal pieces of ARFF equipment for aircraft support; a 1998 P-101 Titan truck and a 2010 Ford/Crash Rescue Equipment Services Renegade (see *Airport Rescue and Fire Fighting*, page 21). Both vehicles meet FAA requirements. As noted on page 21, the P-101 is in good condition and the Renegade is new and in excellent condition. Assuming no changes occur in FAA requirements; no additional equipment will be required. However, at some point during this 20-year planning period, the 1998 Titan will probably require replacement.

INCREASE SRE CAPACITY

The existing fleet consists of four plows, with blades ranging from 8 to 23 feet; a 16 foot broom; and a 5,000 ton/hour blower. Two of the plows and are new and include large body sand storage capacity. See *Airfield Maintenance/Snow Removal Equipment (SRE) Facilities* (page 92) for details. As indicated on page 92, the airport requires fewer plows and connecting carrier vehicles, but does require a front-end loader with at least two bucket attachments. It is recommended that the airport acquire as soon as possible, a large capacity front-end loader and two buckets in the 8-12 and 1-2 cubic yard capacity. In addition, like ARFF equipment, the fleet should be replaced as the age and condition of the equipment dictates, and is eligible for federal funding.

INCREASE SRE FACILITY STORAGE

The existing maintenance/snow removal equipment building, as discussed in Chapter 2 (see *Maintenance*, page 20) is a 7,000 square foot facility. The vehicle side, which is a large open bay with 16 foot eave height, occupies three-quarters of the building, with five storage bays. The vehicle side also contains a maintenance shop, wash and steam clean bay, and storage areas. The personnel side is a two story facility that contains bunk rooms, kitchen, bathrooms (with showers) and miscellaneous storage areas. The analysis of the size building required was performed using current FAA criteria. This analysis considers airport size, a factor of paved runway surfaces. Unlike the equipment analysis, paved runway refers to both runways, not just the primary runway. The total paved runway at Groton-New London equals 1,150,000 square feet. This area equates to a 'large airport' classification for the purposes of sizing SRE buildings.

Total space allocation is based on three separate areas within the building. These are areas for storage of equipment, which includes clearance for equipment safety zones (room for maneuvering, support, etc.), support areas (people), and special equipment areas (HVAC, generators, etc.). As previously indicated (see in *Airfield Maintenance/Snow Removal Equipment (SRE) Facilities* (page 92), the airport has a 4,000 square foot space deficit based on current and forecasted needs. Given the excellent condition of the existing SRE building, it should be expanded if possible, with an addition that will support storing the additional equipment. The problem with expanding it is a lack of usable space. Tower Avenue and the airport boundary border the SRE lot on two sides, an access road to the ramp is in the front, and an existing leased area (TASMG) completes the perimeter of the SRE building area. Any extension should be on the buildings storage bay side; however, this side has limited room for growth.

Expanding to the left side (as shown in the photo) would be on the personnel side, away from easy access to the working side of the building. As an alternative, though expensive, would be to construct a new cold storage building on an available parcel, and then lease out the existing facility. The new facility could serve as both an SRE and ARFF building, but should be in an area not ideally suitable for direct aviation activity because it would reduce potential revenue. The parcels "C" and "D" identified on Figure 5.2 (page 111) are suitable in size, but not ideally located because Tower Avenue divides them from the airside. In addition, a portion of parcel "D" is used by the CAP. A third possible location would be in the Central Terminal Area discussed earlier (see Figure 5.2, page 111). Both plans can be modified to accommodate a new SRE building or an SRE auxiliary building. Whichever approach is taken, future revenue production should be considered and not compromised if at all possible.

EVALUATION OF ALTERNATIVES

The following is an evaluation of the alternatives based on criteria selected in the initial scoping process. This includes an assessment of the airport's operational performance, best planning tenets, including the ability of the airport to operate safely and securely today and throughout the planning period. This assessment includes the proposed changes addressed earlier, and whether they allow for forecasted growth.

OPERATIONAL PERFORMANCE

This AMPU includes an airport operational review and assessment, including capacity, capability, and efficiency. Specifically, this cursory evaluation was:

- An assessment of the Airport's operational policies and practices (e.g.: airport pavement, field and building maintenance; snow clearing; emergency response, etc.)
- Compliance with all applicable standards and recommended practices
- Adequacy of air traffic services, navigational aids and landing aids, and efficiency and effectiveness in use of available human and other resources

Capacity refers to the airport's processing capability of service over a given period. That is, how many aircraft can the airport handle over a period of one-hour, one-day, a year, etc? The evaluation completed as part of the airport's long-range forecast indicate the facility currently has approximately 54,000 annual operations, which is forecast to increase to 63,000 operations. The current annual operational demand equates to approximately nine peak-hour aircraft operations per hour during visual conditions and three in instrument conditions, increasing to 11 and five respectively in 20-years. Conversely, for an airport in the configuration of GON (two runways in a crossing configuration), the annual service volume is 230,000 operations. This equates to between 72 visual operations per hour and a maximum of 20 instrument operations per hour. In all three cases, the airport's demand is well below its capacity. In summary:

- Total demand is 23% of capacity, growing to 27% of capacity in 2028
- VFR PH demand is 13% of capacity, growing to 21% of capacity
- IFR PH demand is 15% of capacity, increasing to 25% in 20-years

Capability refers to the airport's technological system to perform as intended. An assessment of the airport's potential indicates there are no drawbacks or reasons why GON cannot provide services to its users in a manner and fashion expected. While there are some aging systems, such as runway lights, ATC equipment, etc., all systems work as designed and do not impact overall safety or efficiency.

Operational efficiency has a direct impact on safety, user satisfaction and the financial performance of the airport, as well as aircraft owners and operators, and service providers. As part of this assessment, the following operation and procedural areas were analyzed:

- Minimum Standards for Groton-New London Airport (dated 2/10/2010);
- Airspace, including ATC services;
- aircraft characteristics and fleet-mix;
- operations procedures;
- airfield layout, including runway configurations and availability;
- taxiway layout;
- pavement, including surface contamination and irregularities;
- vehicle usage, including delays on taxiways and runway crossings;
- Emergency services preparedness, including the emergency plan;
- Removal of disabled aircraft; Snow clearance and water removal from pavement surfaces;
- Bird control and hazard reduction; and
- Preventive maintenance program.

In each case, the assessment of the airport's operational efficiency indicates the facility is well prepared and fully capable of providing the level of service required today and envisioned throughout this planning period. In part, this level of commitment is because of the facility's Part 139 certification, which because of FAA regulations requires a higher level of control and oversight. In addition, the airport's Rules and Regulations provide an added measure of safety and security.

BEST PLANNING TENETS AND OTHER FACTORS

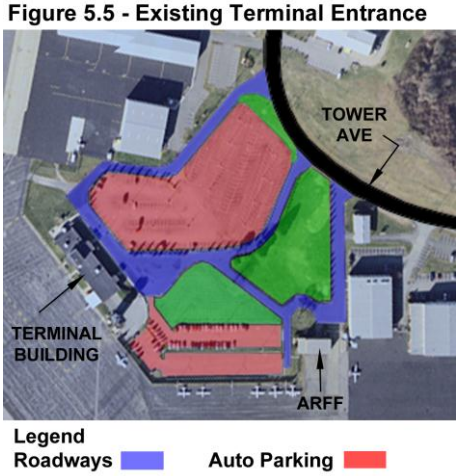
This section is an assessment of the relative strengths and weaknesses of the proposed alternatives. Table 5.1 (page 119) is a matrix that denotes how each project (columns) compares with the tenets (rows) established at the beginning of this project. The following summarizes the best planning tenets of each project.

a. **Replace Terminal/Administration Building**. The existing terminal/administration building is now over forty-six years old. While structurally sound and in good condition[4], its location and layout does not lend itself to maximizing airport resources and revenue. Its location leaves a large unused portion of pavement on the airside that could be used for other purposes, opening up potential future landside space for other purposes, such as hangar development. While this area is not required today, or in the next 10- 20 years, planning ahead on how and where this building can be used should be part of the sponsor's long-term plans for the airport. It would allow for growth beyond the planning horizon; it is technically feasible from an FAA design standpoint.

[4] Based on a walk-through inspection.

b. **New Hangars.** The single largest stream of revenue for any general aviation airport is through hangar development. While current and forecast demand does not indicate a need for new hangars, providing for growth beyond the planning horizon is essential. No other single project addressed in this report provides for the highest and best on airport land use then adding new hangars to the airport's inventory.

Figure 5.5 - Existing Terminal Entrance



c. **Relocate Terminal Service Road**. The current entrance road (blue area on Figure 5.5) is a pavement medley built over a period of time as needed to connect new sections of the terminal area to older parts. Today the pavement is a meandering network that ties up valuable landside resources. In both options addressed earlier, this pavement is consolidated into a more uniform roadway that provides access to all major infrastructure (terminal, hangars, parking). Regardless of which approach is taken, this service road should be a top priority. Both versions provide balance between demand and capacity, provide for the best and highest use of this area, and allows for growth beyond the planning period.

d. **Modify Auto Parking**. No single area on the airport is more in need of immediate attention then the existing terminal automobile parking area. The existing parking lot is a combination of two primary areas (show in red on Figure 5.5) is approximately 142,000 square feet, with room for about 500 vehicles. Current demand requires about 50 spaces, growing to approximately 60 to 70 in the next 20 years. Clearly, this unused space does not provide for the best and highest use of the airport. The two options shown earlier in Figure 5.3 and 5.4 (pages 113 and 115 respectively) conform to best planning tenets and provide a much clearer balance between demand and capacity.

e. **Develop New Hangars**. In reality, the sponsor should develop opportunities for new hangars and related infrastructure. As stated several times already, hangars are the "fundamental" generator of revenue for general aviation airports. While current and projected demand does not require additional hangar space, airport sponsors must always plan for growth while maximizing revenue potential. The cost of operating the airport will never decrease, and often these costs will outpace consumer price indexing built into existing lease agreements. The airport must plan to offer land for development of hangars by private industry, or be prepared to develop and lease units on an as needed basis.

INSERT TABLE 5.1 – Project Assessment

f. **Expand Aircraft Aprons**. The same argument offered for developing new hangars applies to additional aircraft apron space; the two go hand in hand. Aprons in this case are related to the pavement surrounding and necessary for any new hangar development. While the airport does not require under existing and forecasted demand, additional apron space, increasing apron size is a function of hangar development. Aprons should be part of the airport's long-range development plan, as either a private or public venture.

g. **ARFF and Snow Removal Equipment.** This report recommends replacing ARFF vehicles and SRE as needed based not on age, but rather on functionality and technological improvements. As equipment ages, maintenance costs increase to the point where replacement make better fiscal sense. Likewise, equipment becomes obsolete, particulary ARFF, where industry will eventually provide better equipment, such as a fire fighting truck that can be operated by one person instead of two, or one that provides improved vehicle safety. The sponsor must ensure that the airport's ARFF and SRE fleet meet or exceed industry and government standards, and provide a balance between efficiency, safety, and cost.

h. **Expand SRE Building.** The existing SRE building size does not meet current demand. As discussed in *Airfield Maintenance/Snow Removal Equipment (SRE) Facilities* (page 92), the existing building is approximatley 7,000 square feet; however, calculations show that the building should be closer to 11,000 square feet. This deficit is mostly in the maintenance and storage side of the building. However, as discussed earlier (see *Increase SRE Capacity*, page 116) the current SRE building site will not allow for the necessary 4,000 square foot extension. Several possible sites were addressed earlier, and no single site is preferred other any other. In terms of best planning tenets, the sponsor should select a site that will have minimal impact on future revenue production, but first and foremost should select a site that meets safety and efficiency requirements,and satisfies its needs (as the user).

ENVIRONMENTAL FACTORS

Each conceptual landside alternative was screened to determine its potential effect on existing environmental and community resources. The environmental and community resource categories that were considered for this screening include those identified in FAA Order 5050.4B, *National Environmental Policy Act (NEPA) Implementing Instructions for Airport Projects*. These resources are listed in the left-hand column of Table 5.2 (next page) and defined in Appendix 1. The following rating scale and associated criteria were used to screen each conceptual alternative:

1. Benefits/protects environmental and community resources
2. No effects
3. Some negative effects that can be easily mitigated

4. Negative effects that could potentially delay or compromise alternative implementation
5. Significant impacts that cannot be mitigated

In addition to aerial images, the most up-to-date Geographic Information Systems (GIS) data from the Connecticut Department of Environmental Protection (CTDEP), Natural Resources Conservation Service (NRCS), and National Oceanic and Atmospheric Administration (NOAA) were used to facilitate this planning level screening process. Where adverse impacts to resources were identified using the maps and footprints of the conceptual alternatives, the degree or severity of the impact was estimated and incorporated into the overall rating. This environmental screening process is the first step in understanding the potential environmental implications of an alternative. Once an alternative is selected and advanced beyond the concept stage, a more detailed assessment of environmental impacts will be undertaken.

It should be noted that the proposed airside alternatives; which include reducing runway width, upgrading airfield lighting, and upgrading instrument approach procedures, are not anticipated to have any notable environmental impacts.

Table 5.2 – Environmental Screening of Master Plan Alternative Concepts

Environmental Factors[1]	Alternative 1 No Action	Alternative 2 Minimum Build	Alternative 3 Full Build Out
Air Quality	2	3	3
Coastal Barriers	2	2	2
Coastal Zone Management Program	2	3	4
Compatible Land Use	2	2	2
Construction Impacts	2	3	3
Aircraft Noise	2	2	3
Social Impacts	2	2	2
Water Quality	2	3	4
USDOT § 4(f)	2	2	2
Cultural Resources	2	2	2
Biotic Communities	2	2	3
Threatened and Endangered Species	2	3	3
Secondary and Cumulative Impacts	2	2	3
Light Emissions	2	2	3
Natural Resources and Energy Supply	2	2	3
Farmland	2	3	3
Induced Socioeconomic Impacts	2	2	3
Wetlands	2	3	3
Floodplains	2	3	3
Solid Waste	2	3	3
Wild & Scenic Rivers	2	2	2

Note

1. Per FAA Order 1050E, Environmental Impacts: Policies and Procedures and Order 5050.4B, National Environmental Policy Act (NEPA) Implementing Instructions for Airport Projects. Defined in Appendix 1.

FISCAL FACTORS

A rating matrix was developed to assist in the evaluation of each of the two alternatives (partial build and full-build). In addition, preliminary costs for airfield lighting upgrades (see *Upgrade Airfield Lighting*, page 109) are provided. Once the preferred alternatives are

selected, detailed cost estimates will be provided in the financial analysis chapter (pending). Table 5.3 (next page) is a data array that lists each of the infrastructure design considerations, impacts, and costs.

SUMMARY

This chapter assessed the conclusions and findings of Chapters 2 through 4, and identified and evaluated alternative for the airside and landside components, as well as general needs of the airport. The underlying objective was to meet the identified needs for both capacity and safety requirements for the entire airfield operation and infrastructure. This process identified options to address previously identified facility requirements, and provided an evaluation of those alternatives such that stakeholders could gain an understanding of the strengths, weaknesses, and other implication of each, which will lead to selection of the preferred alternative.

This assessment included those facilities that lacked both the capacity and safety shortcomings, as well as a long-term look at the airport to determine how the facility can best addressed revenue production by maximizing available land, in both a fiscally responsible and environmentally sound manner. The evaluation looked at both airside and landside facilities.

With one noted exception, the airside is in excellent condition, requiring very little change other then routine maintenance and upgrades as systems wear out or are replaced by improved systems. Other airside systems that will require attention at some point in the future include the width of both runways (see *Reduce Runway Width*, page 109).

Table 5.3 – Fiscal Considerations

Criteria	Airside	Landside Alternative 1	Landside Alternative 2
Upgrade Airfield Lighting			
PAPI Upgrades[1]	$200,000		
Taxiway Light LED Upgrades[2]	$550,000		
Terminal Remodeling		$500,000	
Terminal Replacement			
Unit 5A (ARFF)			$500,000
Unit 5B			$1,000,000
Unit 5C			$1,000,000
Unit 5D			$2,000,000
Control Tower			$1,000,000
ARFF Remodeling		$100,000	
Auto Parking Expansion		$300,000	$1,000,000
Entrance Road Redesign		$100,000	$500,000
Hangar 1		$2,500,000	$2,500,000
Hangar 2		$2,500,000	$2,500,000
Hangar 3		$350,000	$1,000,000
Hangar 4			$1,000,000
Hangar 6			$550,000
Hangar 7			$550,000
Hangar 8			$300,000
Hangar 9			$300,000
Hangar 10			$300,000
Aircraft Apron		$400,000	$1,500,000
Demolition			$500,000
Total	**$750,000**	**$6,750,000**	**$18,000,000**

Notes

1. $50,000 per runway end for equipment and installation.

2. Approximately 220 lights for Runway 5-23; 180 for Runway 15-33; plus 100 additional lights for other taxiway segments.

Runway 5-23 is 150 feet wide, but only requires 100 feet, and Runway 15-33 is 100 feet and by standards could be 75 feet. However, in both cases, runways are not arbitrarily reduced in width, but rather evaluated when due for a major reconstruction project. In both cases, the runways are in excellent condition and should not require this type of work for many years. The last airside components addressed in this section is lighting, which includes VGLS and taxiway lights.

VGLS provides the pilot with a safe and accurate glide slope on final approach to the runway. A row of PAPI or a VASI configuration placed perpendicular to the approach path are seen by the pilot in combinations of red and white to indicate a path that is too high, too low or correctly on slope. GON has a PAPI on runway ends 23 and 33, and VASI on Runway 23 (see page 15), but could use systems on the other two runway ends, 5 and 15.

Finally, it is recommended that the airport upgrade its taxiway lighting system and eventually runway lighting systems to LED fixtures.

A major element of this chapter was devoted to the airport's landside. Three key components were addressed: the terminal building, aircraft apron space, and aircraft hangars to meet both future demand and increased revenue potential. As discussed in Chapter 3, the airport has a surplus of aircraft parking apron and hangar space. Forecasts show a surplus of hangar space; however apron space will reach capacity in the next 15-20 years. In addition, the terminal building, while in fair condition, is outdated and in need of repairs and a general facelift. Notwithstanding this assessment, this report does recommend taking a long-term look at the airport and how to maximize revenue production while making the facility more attractive to both its users and investors.

Besides taking the "do nothing" approach, this report recommended two alternative design concepts for what was referred to as the central terminal area (see areas C, G, and H on Figure 5.2, page 111). The two Alternatives suggest either a minimum development approach where the majority of the existing landside remains essentially unchanged, but with a revamped auto parking area and additional hangars. The second, more comprehensive (and expensive) approach suggests a total redesign of the central terminal area, with not only numerous new hangars of various sizes, but a completely new terminal facility, including a new ARFF building and control tower. This model takes advantage of unused space between the existing terminal and the runways, moving facilities and structures closer to the existing BRL; thus opening up unused but available space for development and potential revenue.

CONSULTANTS RECOMMENDED ALTERNATIVE

The recommended alternative for GON is to maintain the facility to its current high standards, which includes full compliance with the airport operating certificate under Part 139. This process includes upgrading lighting facilities, snow removal and firefighting

equipment and buildings, and other ancillary facilities and equipment as necessary to commercial airport standards.

As with any airport, the need to generate sufficient revenue to cover operating and maintenance costs is essential. The airport's historic and current financial resources were examined. This assessment looked at fiscal years 2002 through 2007 (which was the most recent at the time). While the airport has shown considerable revenue growth, while cutting costs, it was still reporting a $90,000 deficit; a shortfall that comes from state revenue. To overcome this shortage, plus position itself for future infrastructure changes that may require at least matching funds to apply against federal grants, the airport should plan on changes now that will raise revenue. This primary means for a general aviation airport to raise revenue is through land leases, hangar sales, or rentals, and apron fees. Other charges such as landing fees, fuel sales, and short term hangar storage are also employed. This is the primary reason why Alternatives 2 and 3 were developed. As discussed, Alternative 3 is the most aggressive plan, but will take years of planning, promotion, and development to see through to fruition. And again, the concepts shown in the two alternatives are planning visions; options that show what is possible in the land area available.

Given the purpose and future of GON, and the need for long term planning, Alternative 3, in its current or some variation is recommended. In short, the Sponsor should plan to maximize development and revenue production. While there are some environmental issues to address as noted, these negative effects can be mitigated. The next working paper will address each preferred alternative in detail.

Table 5.4 (next page) lists the consultants recommended alternatives along with a cross-reference to the section and page where each concept is discussed.

Table 5.4 – Consultant's Recommended Alternatives

Facility	Recommendation	Timeline (Trigger)	Reference Pages
Runways	Reevaluate width requirements and adjust	Next major reconstruction	74, 98
	Upgrade Edge Lighting	Next major reconstruction or as needed	15, 76, 98
	Install PAPI/Replace VASI	As soon as practical	15, 77, 98
Taxiways	Replace edge lighting with LED Technology	Next major reconstruction or as needed	17, 98
Terminal Building	Replace	As public and private funding allows, and demand dictates, but before major remodeling is required	19, 81, 98, 108
SRE Building	Expand storage capacity	As funding becomes available	82
ARFF Building	Replace	Replace when new terminal building is constructed	83
Equipment – ARFF & SRE	Replace and Upgrade	As required for aging fleet and new technology and regulatory changes	21, 82, 109
Hangars	Develop long-term concept; establish lease areas and conditions.	Develop as needed	80, 109
Aprons	Monitor based aircraft demand against current capacity	Develop as needed	78, 109

PREFERRED ALTERNATIVE

After review by the sponsor[5], the consultants preferred alternative (see page 126) was presented to the public on June 9, 2011[6]. Following a examination of comments from this meeting as well as the FAA and discussions internally with the sponsor and consultant, a preferred alternative concept emerged.

The sponsor decided that while the full-build out, Alternative 3 (see page 114) represented its long-term vision of the airport, the probability of it happening for both financial and community barriers was low. This alternative essentially redeveloped the entire terminal area, including the replacement of the terminal building and adjacent auto parking lot, as well as the air traffic control tower. In addition, this option indicated the development of approximately 8-10 new hangar facilities along with associated aircraft and vehicle parking

[5] State of Connecticut
[6] Minutes from this meeting and other public presentations are contained in Appendix 5.

areas. While this concept was developed to show the potential in this area, all parties agreed that a scaled back version, with a less aggressive development plan was more realistic at this time; one that could be feasibly built in the next 10-20 years.

The stakeholders also agreed that the no-build concept (Alternative 1 on page 110) was equally not realistic given the 20 year timeframe of this master plan. While the current demand for a new terminal building and terminal space and hangars is low, some growth is inevitable and the airport must be positioned for change when it comes.

The sponsor decided to move forward with a modified version of Alternative 2 (presented on page 112). This option keeps the existing terminal building (and control tower) in place, but modifies the vehicle parking area by reducing its overall size and capacity and eliminates one of two access points off of Airport Avenue by creating a single access. This change allows for ample vehicle parking, while setting aside ample space for future aviation development. This concept, shown in Figure 5.6 (next page), provides an area that serves the airport more efficiently, while providing sufficient space for future hangar and related aviation business development.

AIRPORT LAND USE ALTERNATIVES

With selection of the airport's preferred alternatives, general options for airport property not needed for aviation purposes can be identified. During the development of this update an examination of all airport property was completed. This property includes land on the circumference of the airside as well as property in the landside, including land around the terminal area on both sides of Tower Avenue. In addition, we examined land around the Groton VOR (see *Air Navigation Systems*, page 14).

Our examination of airport property indicates that once land not already used or reserved for aviation purposes is excluded; there is little property left for non-aviation use. Property already used for or required for aviation or other purposes includes the areas listed below.

- Runways and associate safety areas and other required setbacks
- Taxiways and associated safety areas and other required setbacks
- Aprons and other aircraft parking areas
- Hangars and employee/visitor parking areas
- Airport and private maintenance facilities and storage areas
- Terminal building and vehicle parking lot
- Air traffic control tower
- VOR and protected land around it
- Protected shore land and tidal zones along Poquonnock River and Baker Cove
- Wetlands (other than above) on the northeast side of Tower Avenue

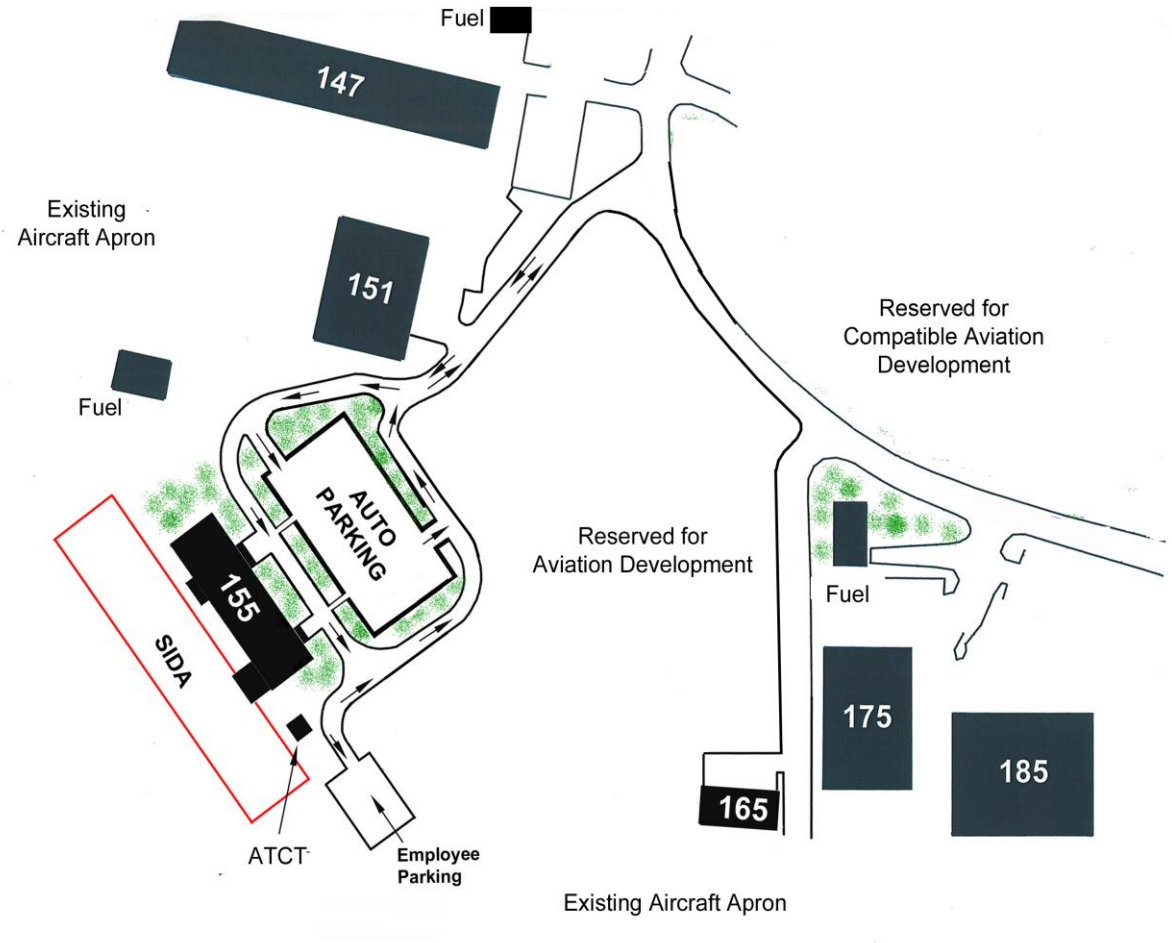


Figure 5.6 – Preferred Alternative (Terminal Area)

Figure 5.7 (next page) shows the current terminal area. This figure shows nine areas identified for possible development. The five areas labeled as A, E, F, G, and H are inside the airport's landside area (between Tower Avenue and the airport's airside) and should only be used for direct aviation development (hangars, airport related businesses, such as FBOs, etc). The four areas on the opposite side of Tower Avenue (identified as B, C, D, and I), that do not have direct access to the airside, should be reserved for development "compatible with aviation", meaning the activities that take place will not interfere with aircraft operations.

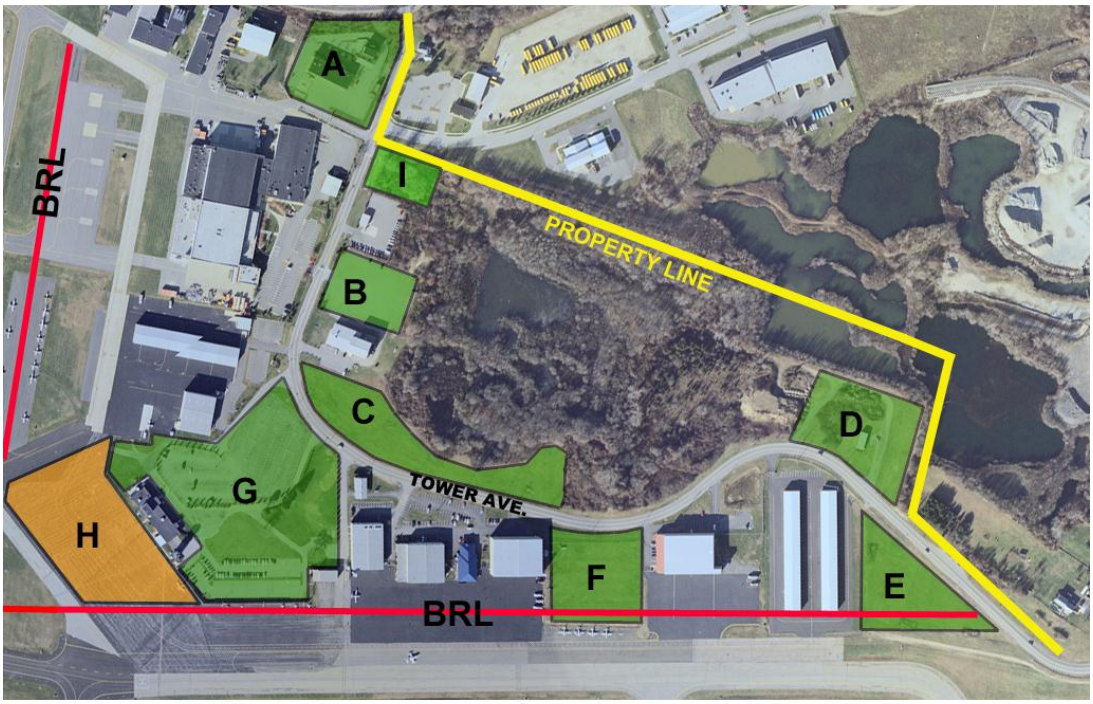


Figure 5.7 - Airport Landside Development Areas

The airport sponsor has elected to take a conservative approach to the future of GON. This policy is both fiscally and socially responsible because it does not commit the airport to spending funds other than to ensure the airport is maintained to both federal and state standards, including those necessary to retain its airport certification under Part 139 (see Appendix 2). In addition, it provides ample space for private development, as well as possible development and expansion of TASMG.

Most, if not all of the sponsors future financial resources should be for ongoing maintenance of the airport as well as facility upgrades as needed, such as lighting improvements, expansion of the SRE building, and modernizing/upgrading the terminal and ARFF building, etc. Table 5.5 (next page) lists the sponsor's preferred alternatives and is the basis of the rest of this report, which includes an Environmental Review, the Airport Layout Plan set, a Facility Implementation Plan, and Capital Improvement Plan.

Table 5.5 – Preferred Alternatives

Facility	Recommendation	Timeline (Trigger)	Reference Pages
Runways	Reevaluate width requirements and adjust	Next major reconstruction	74, 98
	Upgrade Edge Lighting	Next major reconstruction or as needed	15, 76, 98
	Install PAPI/Replace VASI	As soon as practical	15, 77, 98
Taxiways	Replace edge lighting with LED Technology	Next major reconstruction or as needed	17, 98
Terminal Building	Modernize	As public and private funding allows	19, 81, 98, 108
SRE Building	Expand storage capacity	As funding becomes available	82
ARFF Building	Modernize	As funding permits	83
Equipment – ARFF & SRE	Replace and Upgrade	As required for aging fleet and new technology and regulatory changes	21, 82, 109
Hangars	Develop long-term concept; establish lease areas and conditions.	Develop as needed	80, 109
Aprons	Monitor based aircraft demand against current capacity	Develop as needed	78, 109